

Coastal Ocean Circulation Experiment off Senegal (COCES)

Pierre-Marie Poulain
Istituto Nazionale di Oceanografia e di Geofisica Sperimentale
Borgo Grotta Gigante, 42/c
34010 Sgonico (Trieste), Italy
Phone: +39 040 2140322 Fax: +39 040 2140266 Email: ppoulain@ogs.trieste.it

Award #: N000140811038
http://poseidon.ogs.trieste.it/sire/drifter/coces_main.html

LONG-TERM GOALS

To investigate the dynamics of coastal areas dominated by buoyancy input and wind forcing, influenced by complex topography and interacting with the deep ocean. To improve the understanding of coastal marine environmental evolution, with particular emphasis on eddy dynamics.

OBJECTIVES

The general objective of the COCES project is to investigate the coastal dynamics off NW Africa in the tropical Atlantic Ocean. In particular, it is planned to study the near-surface dispersion and circulation off the coast of Senegal (see Fig. 1), a region strongly influenced by coastal upwelling dynamics and affected by the runoff of an important river, using drifter observations and ancillary satellite data (SST and ocean color) over about a year (from spring 2009 to winter 2010), in collaboration with local oceanographers.

APPROACH

Surface drifters will be deployed at key locations on the continental shelf and slope to maximize the geographical coverage in the study area and to construct maps of mean circulation and eddy variability under winter (upwelling) and summer conditions. These deployments will mostly be in clusters of two or three drifters deployed monthly or every two months, in order to assess the horizontal dispersion of the surface waters (Lagrangian dispersion statistics).

Other drifters will be deployed near the vicinity of the Senegal River mouth near Saint-Louis (Fig. 1) to study the river plume dynamics under several wind (e.g., NE upwelling favorable and SW downwelling favorable winds) and discharge rate conditions.

All the drifter data will also be analyzed in concert with satellite images (SST and ocean color) to describe qualitatively the surface dynamics, with particular focus on mesoscale circulation features such as eddies and filaments.

Training and capacity building activities are also proposed to teach Senegalese people to operate drifters, to process their data, and to analyze the scientific results obtained from them.

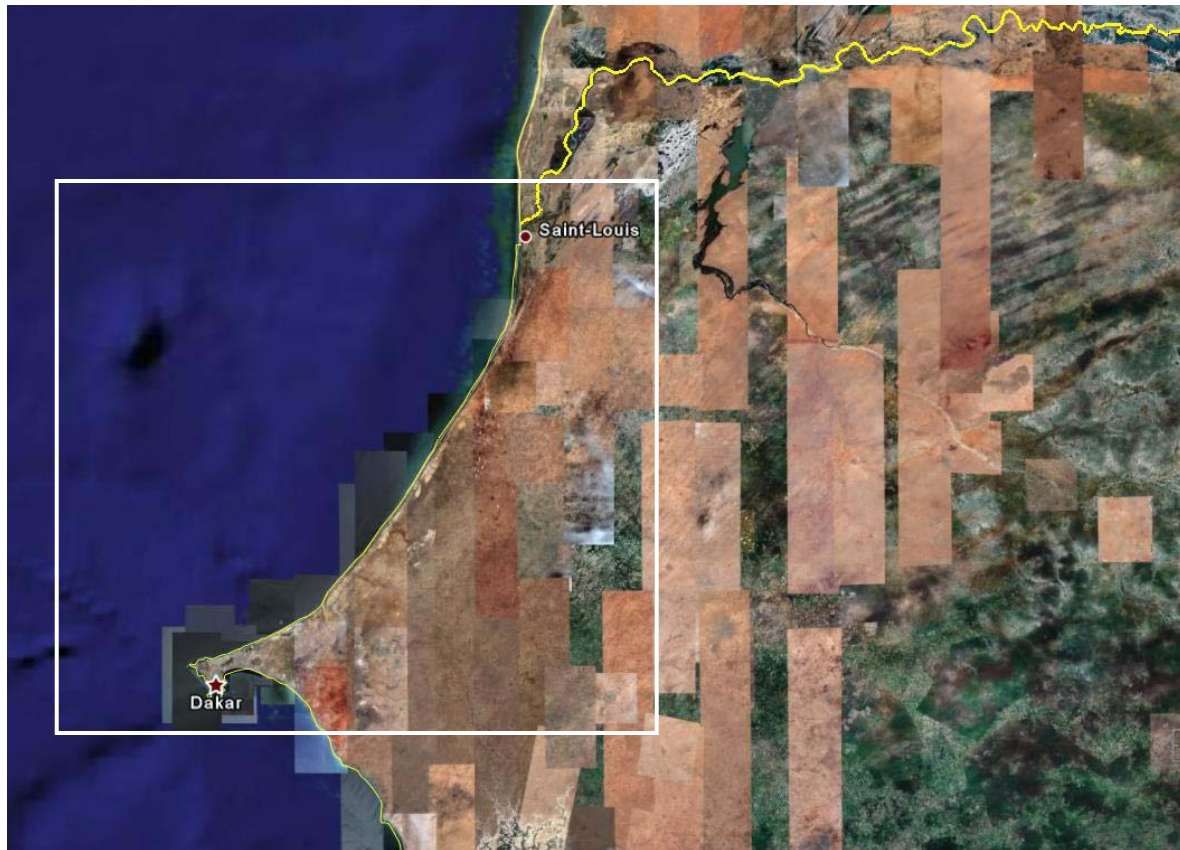


Figure 1. Partial geographical map of Senegal in NW Africa. The study area is depicted with a white rectangle (coastal areas between Dakar and the mouth of the Senegal River in Saint-Louis). The Senegal River is shown as a yellow curve also the border with Mauritania).

WORK COMPLETED

Except for preliminary contacts with local oceanographers in Senegal, none of the tasks mentioned above has effectively started as of September 2008. Procurement and planning for the drifter deployments will start in fall 2008 and winter 2009.

RESULTS

N/A

IMPACT/APPLICATION

The scientific impact of this project is to increase our understanding of the coastal dynamics off NW Africa and its interaction with the tropical Atlantic Ocean. Future application could be the validation of

diagnostic numerical models and the assimilation of the drifter data into prognostic numerical models of coastal ocean circulation.

RELATED PROJECTS

In addition to national programs conducted by collaborators in Senegal, the COCES project is related to the Global Drifter Program (GDP) in the Atlantic Ocean (P.I. : Dr. R. Lumpkin, NOAA/AOML, Miami).

<http://www.aoml.noaa.gov/phod/dac/gdp.html>